2017

# 2017 Pesticide Safety - Insect IPM 2017

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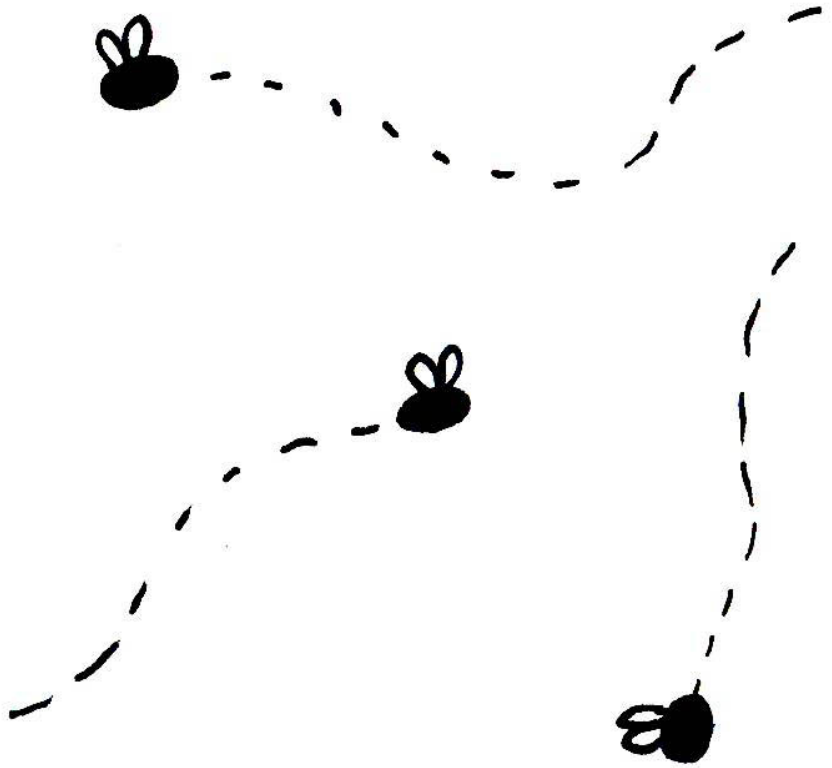


# INSECT IPM, ANOTHER SEASON

ANNE L AVERILL

# Three moth pests: larvae feed on buds or leaves in spring

- Winter moth – eggs hatched/2017 larvae are out now

- Gypsy moth – eggs will hatch in a few days

- Sparganothis fruitworm – larvae active soon

# Winter moth

Earliest of the cranberry pest species, is an inchworm, larva wriggles its way into swelling buds

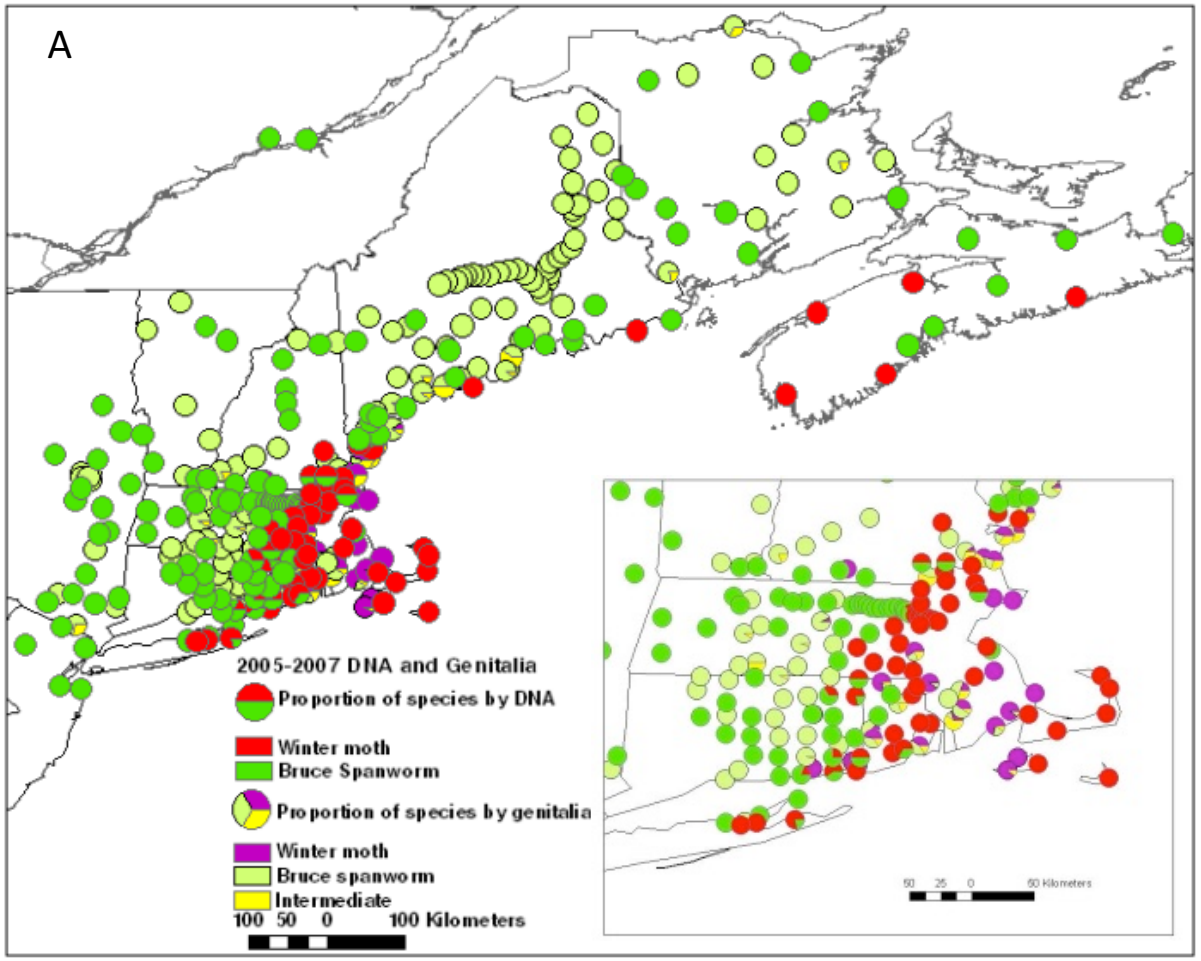
Thanks to Tawny Simisky (UMASS) for generously giving me her recent talk + photos about winter moth

# **Winter moth** male (left) flies late fall and female (right) has tiny non-functioning wings

Male winter moth resting on the side of a house at night.

Female winter moth found on the trunk of a tree. Note the tiny, vestigial wings; female winter moths cannot fly.

Winter moth is not hative: has invaded our area.
Survey in 2005-2007 with pheromone traps, easily confused with another spanworm moth (Bruce spanworm).
Winter moth (red) found in warmer-temp coastal regions



Overwintering **winter moth** eggs are orange but turn blue a few days before hatching.

# **Monitoring** egg hatch to time insecticide
## Blue eggs have hatched

March 24, 2016 Kingston, RI

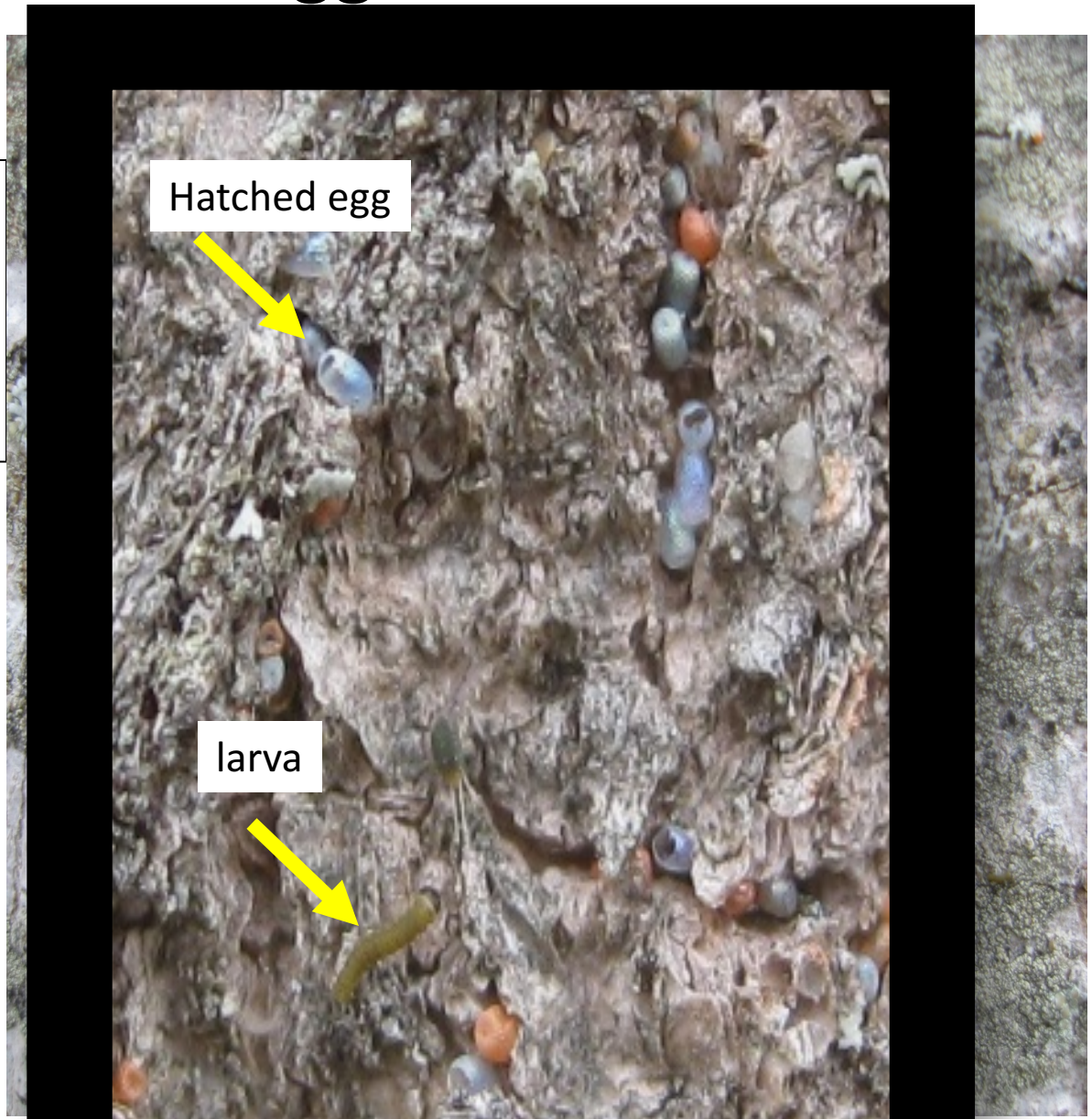



Photo by Heather Faubert, URI

# Winter moth has hatched 2017

- May completely defoliate trees
- Feeds on aak, maple, cherry, basswood, ash, crabapple, blueberry, etc.

- Small larvae may balloon into bogs

# A very tough insect to manage

- Winter moth larvae worm their way inside of swollen cranberry buds and begin feeding.

- Once inside buds, they are protected from insecticide sprays until the bud opens

# Tiny larva inside blueberry bud

University of Rhode Island

# Winter moth management

- When still small, easily killed
- Will destroy bud if not managed;
- rule of thumb: if infestation last year + flight of males observed late fall/early winter> spray prophylactically

# Winter moth management

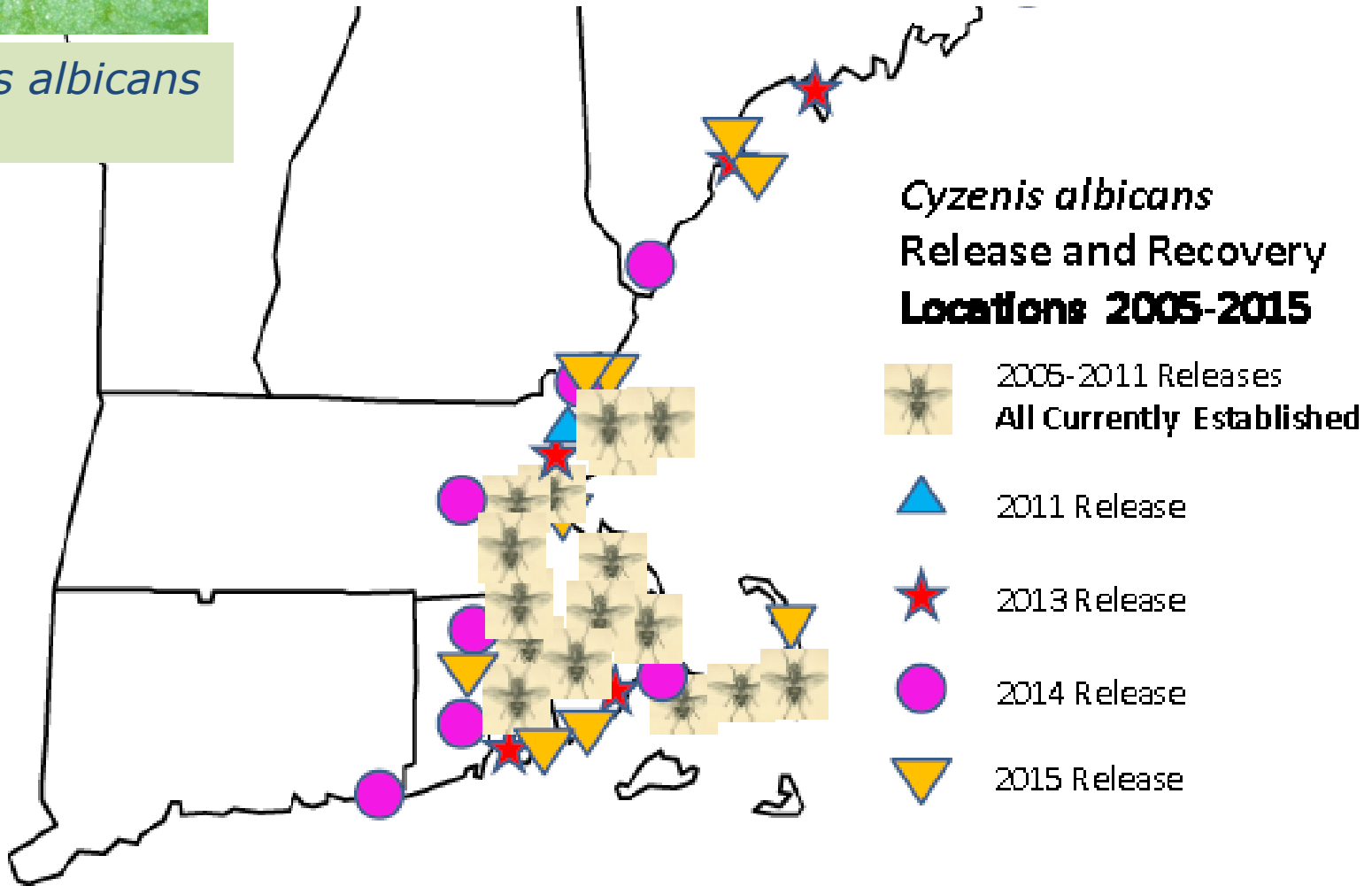
- Local extension is monitoring hatch, keep in this loop
- Detect or Suspect
  - **Delegate**
  - **Avaunt**
  - **Intrepid**

# UMASS biological control project for winter moth

- Joe Elkinton lab is acknowledged for this research
- Fly is agent > its larva grows inside the winter moth larva, eventually killing it

*Cyzenis albicans*

The fly has been released as a biological control agent at 47 sites; flies recovered in following years at 21 of those locations are indicated by the fly symbol



- The Elkinton Lab has reported that the number of pupating winter moth  in 2016 (at their study sites) was much lower than what has been observed in previous years.
- Reports from Hanson, MA indicate fewer winter moth eggs are present on monitored trees than in previous years.

- Maybe lower **winter moth** infestation this year?!

# Gypsy moth

Check in a couple weeks via sweep net; particularly along edges near infested trees

# Like winter moth, gypsy moth females are flightless

Flightless female

Male

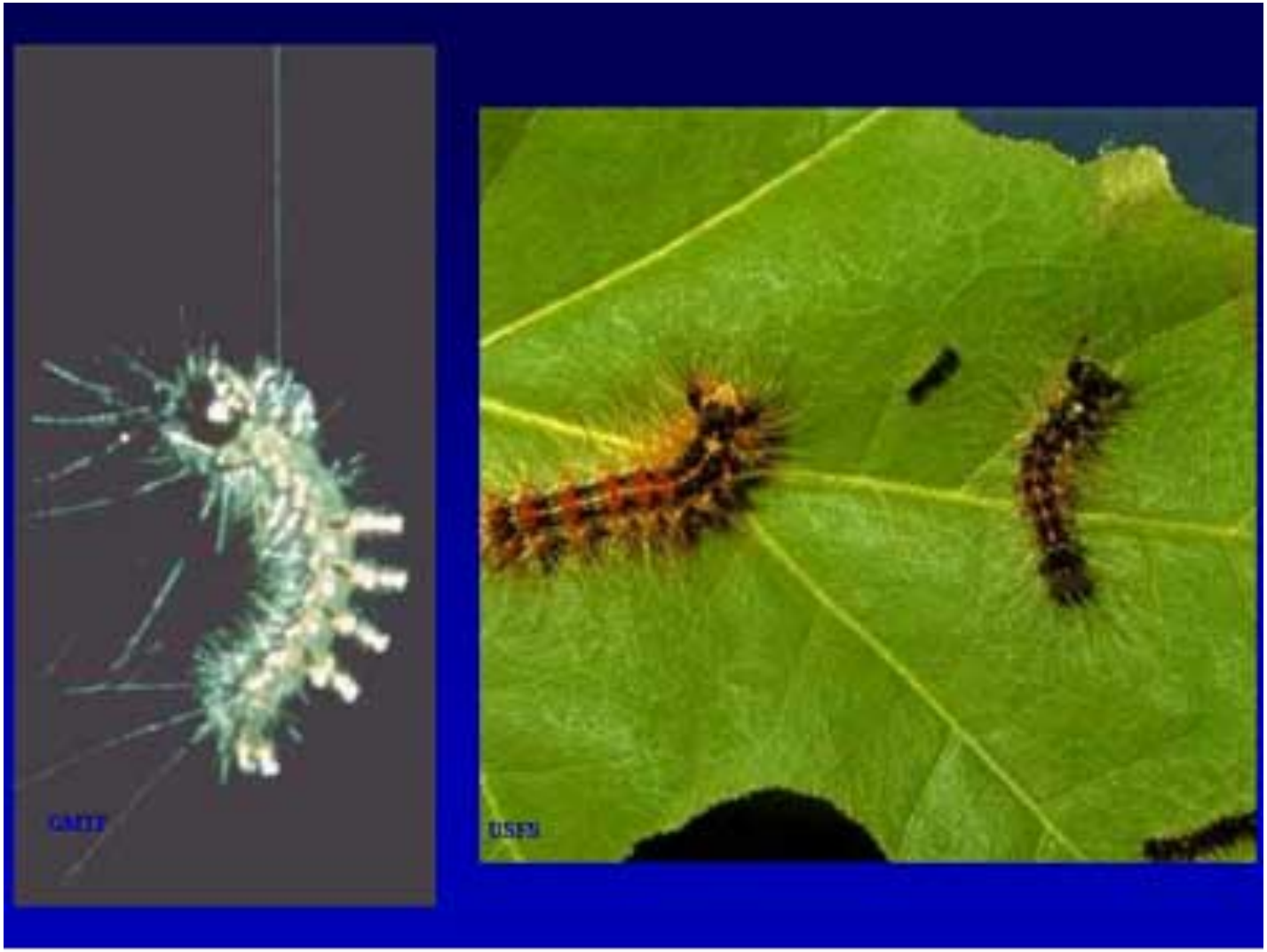
Males, fly in late July

# Eggs masses obvious: fuzzy and tan


# Hatch around first week of May

# May totally defoliate trees, reached outbreak numbers in 2016

# Larvae balloon in on silk thread and are carried by wind to cranberry from trees on the woods edge



Gypsy moth caterpillars ballooning on silk (left)
or on oak leaf, a favorite food (right).

# Biological control: fungus *Entomophaga maimaiga*: attacks gypsy moth

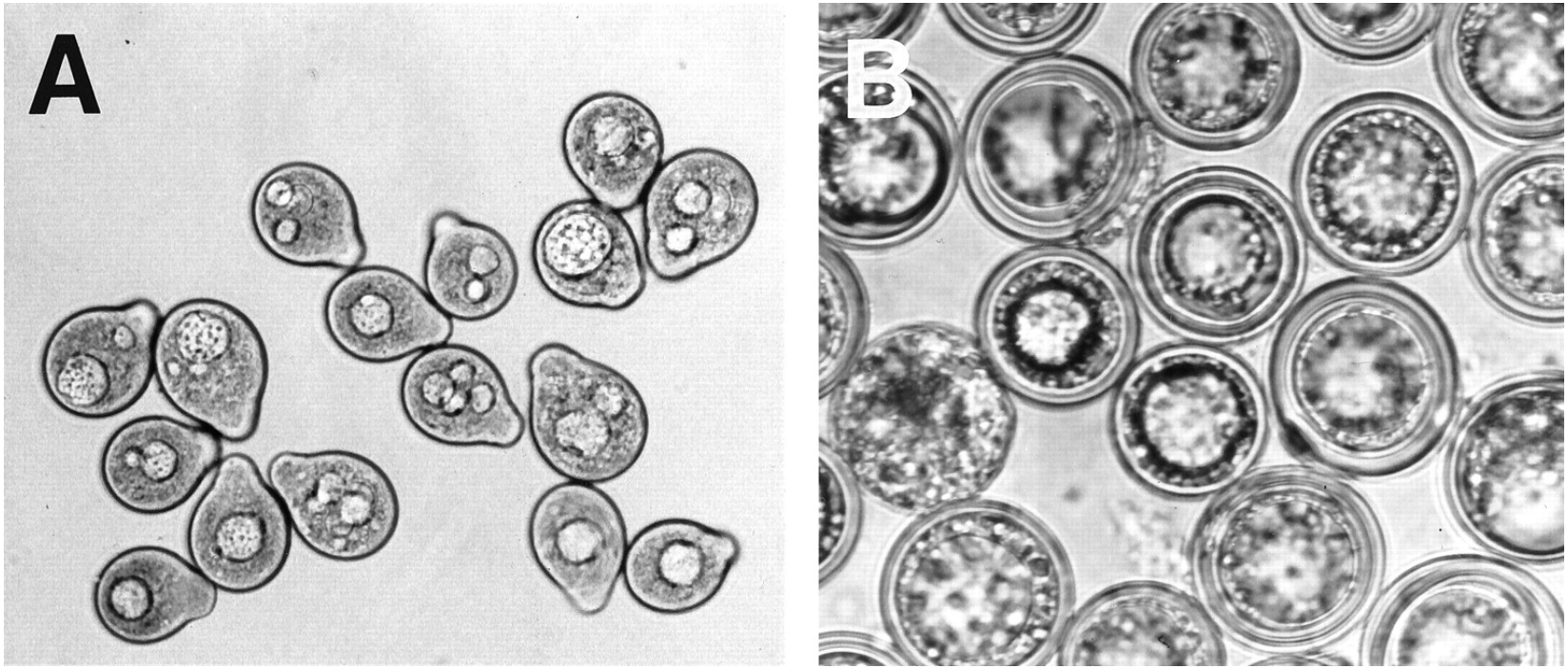
- Fungal infection thought to be one of the most important factors holding down gypsy moth populations

- **Moisture and cool conditions favor the fungus**

Fungal-nfected larva

# Spores of the fungus: favored by moisture

**(A) Pear-shaped conidia actively discharged from the surface of cadavers (average conidial dimensions, 20.6 by 26.6 μm).**




Ann E. Hajek Microbiol. Mol. Biol. Rev. 1999;63:814-835

- Gypsy moth and fungus researchers suspect that drought conditions in 2014 and 2016 shut down fungus, allowing gypsy moth outbreak

# Gypsy moth in 2017

- Infestation **could be huge** outbreak situation if no help from fungus (or virus) again owing to dry weather

- Larvae get large and are ferocious eaters of buds and new growth

# Gypsy moth management

- Manage small larvae, sweep early, check edges; train eye to see tiny and hairy larvae

- If detect at rate of 4-5 larvae/25 sweeps/acre
  - **Delegate**
  - **Avaunt**
  - **Intrepid**

# Sparganothis fruitworm

Hard to pick up in net, hard to manage, resistance threat

Elvira de Lange

# Sparganothis fruitworm



Comes in different styles— but spasm wriggle behavior is characteristic

# Moth has distinctive color and markings

Elvira de Lange

# Sparganothis management

- Spring sweeps
  - A couple larvae/acre is enough to trigger spray
- Visual inspections of loosestrife for webbed tips; when disturbed, larva will drop out-easy to miss

- **Secret to management is dealing with first generation**

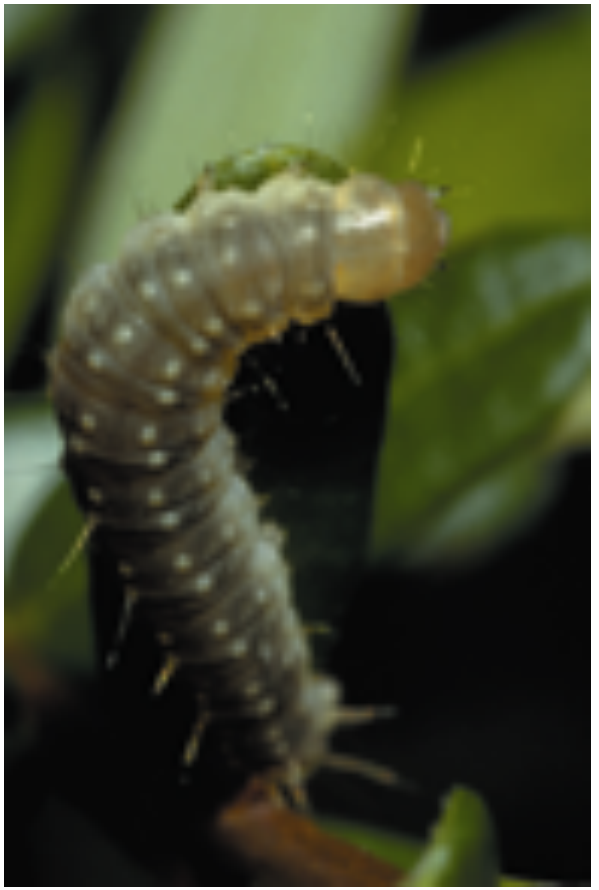
# Sparganothis management **in spring**

- Sweep, starting end May
- Catch the infestation early and use least-dilute **Intrepid**
  - High residual
  - May need multiple applications

- If larve have gotten larger, **Delegate**

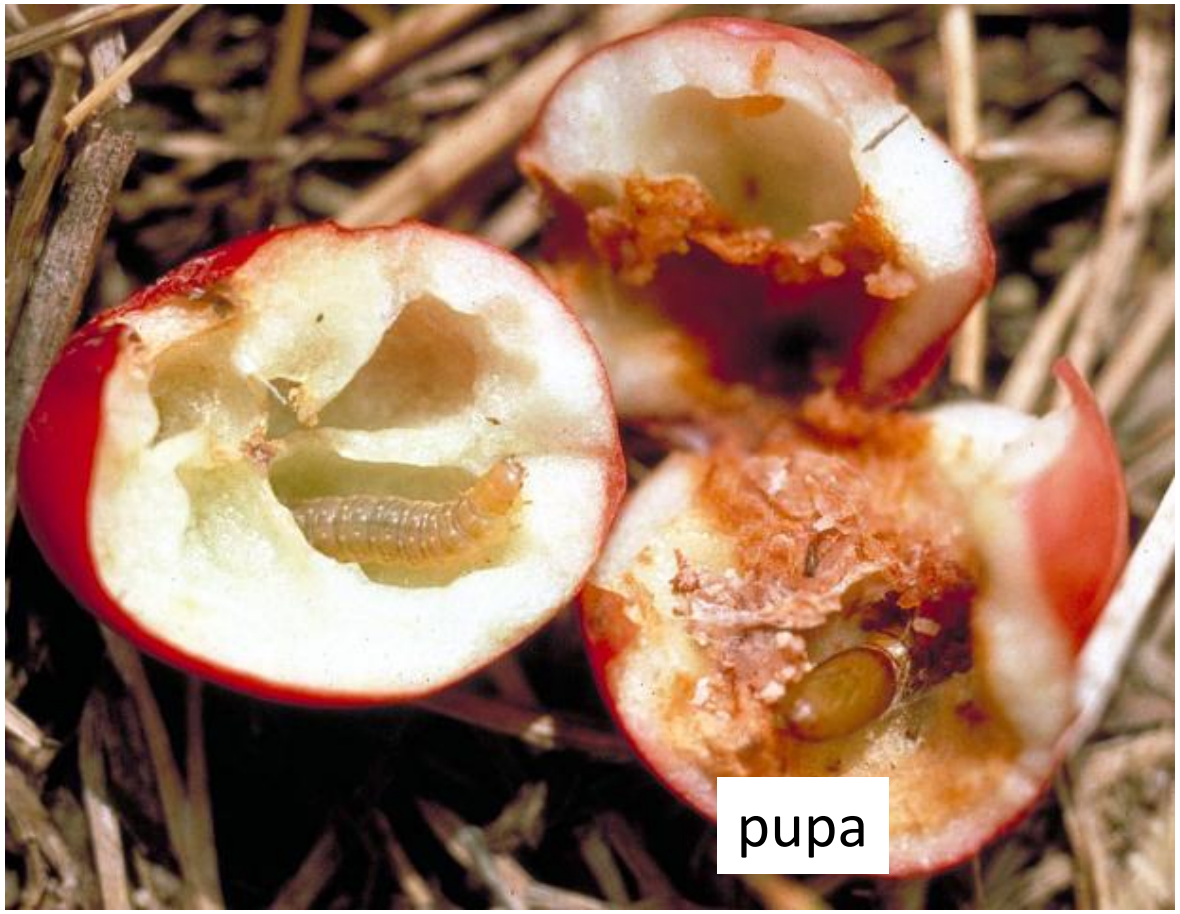
# Sparganothis management

- Intrepid is better for preserving natural enemies for biological control
- K**eep Intrepid in the mix**
  - for resistance management
  - this insect is **just waiting to become resistant** to Delegate!
- **Delegate** is highly effective
- Avaunt is not very effective



# Sparganthis **in summer** is hard to manage

Summer generation Sparganothis may enter fruit and be protected from sprays; **need to distinguish from a cranberry fruitworm infestation—management is totally different**



# Sparganothis fruitworm: pheromone traps put out in June tell whether you had good management in spring


Put trap out June 1. Use 1 trap/10 acres. Place on upwind side of bog. After first deploying, every few days to see when moth flight starts (called the biofix).

**If using Intrepid**:
Apply Intrepid 3 weeks after biofix; again 10-14 days later

# Sparganothis fruitworm: pheromone traps put out in June tell whether you had good management in spring


Put trap out June 1. Use 1 trap/10 acres. Place on upwind side of bog. Check and clean traps weekly, recording number of moths captured.

**If using Delegate**:
Apply 10-14 days after **peak** moth captures, (~mid-to-late July).

- If it turns out you have a Sparganothis problem, you're going to kick yourself if you didn't do the simple thing of putting a trap out to better time your sprays and to see what you're up against